

## Chapter Two

### Plant Assets and Intangible Assets

#### Introduction

**Dear Learner!** Do you remember that assets are categorized into two major classes?

Assets, in general, are classified as current assets and plant assets. Plant assets are major expenditures for many companies. They make up a large part of assets on the balance sheet. Plant assets are future benefits for any organizations. It is helpful to think of a plant asset as an amount of usefulness contributing to the operations of a company throughout the asset's life. While the plant assets are used in the operation of the business, their value gradually decline. An accounting method to account for such decline in service capacity of plant assets is called depreciation, and this will be discussed in this chapter. You will also study how depreciation is computed and recorded.

Additional expenditures are incurred to make the plant assets render better service. Hence, you will be introduced with the revenue and capital expenditures. The accounting treatment at time of disposing plant assets will also be explained. The basic plant assets disposal methods such as selling, exchanging for other asset, and discarding are included in the discussion.

In this chapter, you will also learn about accounting for intangible assets and natural resources, which are non-current assets like plant assets.

After having studied and worked through this chapter, you will be able to:

- Identify Nature of plant assets
- Compute depreciation for plant assets using various depreciation methods
- Record depreciation expense in the accounting records
- Distinguish expenses from expenditures that should be capitalized
  
- Recognize additional expenditures made on plant assets;

- Record the disposal of a plant asset.
- Record the cost and amortization of intangible assets,
- Identify the cost component of natural resources, and record the costs and depletion of natural resources.
- Identify Presentation of fixed assets and intangible assets on the balance sheet

### **1.1. Nature of Plant Assets**

Businesses purchase and use a variety of fixed assets, such as equipment, furniture, tools, machinery, buildings, and land. Fixed assets are long-term or relatively permanent assets. They are tangible assets because they exist physically. They are owned and used by the business and are not offered for sale as part of normal operations. Other descriptive titles for these assets are plant assets or property, plant, and equipment. The fixed assets of a business can be a significant part of the total assets.

Plant assets are often a significant portion of the total assets of a company.

### **Classifying Costs**

A cost that has been incurred may be classified as a plant asset, an investment, or an expense. The following diagram shows how to determine the proper classification of a cost and, thus, how it should be recorded. As shown in the diagram, classifying a cost involves the following steps:

Step 1: Is the purchased item (cost) long-lived?

- If yes, the item is capitalized as an asset on the balance sheet as either a fixed asset or an investment. Proceed to Step 2.
- If no, the item is classified and recorded as an expense.

Step 2: Is the asset used in normal operations?

- If yes, the asset is classified and recorded as a plant asset.
- If no, the asset is classified and recorded as an investment.

Costs that are classified and recorded as plant or fixed assets include the purchase of

land, buildings, or equipment. Such assets normally last more than a year and are used in the normal operations. However, standby equipment for use during peak periods or when other equipment breaks down is still classified as a fixed asset even though it is not used very often. In contrast, fixed assets those have been abandoned or are no longer used in operations are not fixed assets. Although fixed assets may be sold, they should not be offered for sale as part of normal operations. For example, cars and trucks offered for sale by an automotive dealership are not fixed assets of the dealership. On the other hand, a tow truck used in the normal operations of the dealership is a fixed asset of the dealership.

Investments are long-lived assets that are not used in the normal operations and are held for future resale. Such assets are reported on the balance sheet in a section entitled Investments. For example, undeveloped land acquired for future resale would be classified and reported as an investment, not land.

### ***Cost of Plant Assets***

The costs of acquiring plant assets include all amounts spent to get the asset in place and ready for use. For example, freight costs and the costs of installing equipment are part of the asset's total cost. The following table summarizes some of the common costs of acquiring fixed assets. These costs are recorded by debiting the related fixed asset account, such as Land, Building, Land Improvements, or Machinery and Equipment.

#### **Cost of Acquiring Fixed Assets**

<b>Building</b>	<b>Machinery &amp; Equipment</b>	<b>Land</b>
<ul style="list-style-type: none"> <li>• Architects' fees</li> <li>• Engineers' fee</li> <li>• Insurance cost incurred during construction</li> <li>• Interest on money borrowed to finance construction</li> <li>• Walkways to and around the building</li> </ul>	<ul style="list-style-type: none"> <li>• Sales taxes</li> <li>• Freight</li> <li>• Installation</li> <li>• Repairs and reconditioning (purchase of used equipment)</li> <li>• Insurance while in transit</li> </ul>	<ul style="list-style-type: none"> <li>• Purchase price</li> <li>• Sales tax</li> <li>• Permits from government agencies</li> <li>• Broker's commissions</li> <li>• Title fees</li> <li>• Surveying fees</li> <li>• Delinquent real estate taxes</li> </ul>

<ul style="list-style-type: none"> <li>• Sales tax</li> <li>• Repairs and (purchase of existing building)</li> <li>• Modifying for use</li> <li>• Permits from government agencies</li> </ul>	<ul style="list-style-type: none"> <li>• Assembly</li> <li>• Modifying for use</li> <li>• Testing for use</li> <li>• Permits from government agencies</li> </ul>	<ul style="list-style-type: none"> <li>• Removing unwanted building less any salvage</li> <li>• Grading and leveling</li> <li>• Paving a public street bordering the land</li> </ul>
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Land improvements
<ul style="list-style-type: none"> <li>• Trees and shrubs</li> <li>• Fences</li> <li>• Outdoor lighting</li> <li>• Paved parking areas</li> </ul>

Only costs necessary for preparing the fixed asset for use are included as a cost of the asset. Unnecessary costs that do not increase the asset's usefulness are recorded as an expense. For example, the following costs are included as an expense:

- ☐ Vandalism - Deliberate destruction, defacement or damage of public or other people's property.
- ☐ Mistakes in installation
- ☐ Uninsured theft
- ☐ Damage during unpacking and installing
- ☐ Fines for not obtaining proper permits from governmental agencies

A company may incur costs associated with constructing a fixed asset such as a new building. The direct costs incurred in the construction, such as labor and materials, should be capitalized as a debit to an account entitled Construction in Progress. When the construction is complete, the costs are reclassified by crediting Construction in Progress and debiting the proper fixed asset account such as Building. For some companies, construction in progress can be significant.

The acquisition cost of land includes the negotiated cash price plus other costs such as the cost of land surveys, legal fees, title fees, broker's commissions, cost of preparing

the land to build on, and even the demolition costs of old structures that might be torn down to get the land ready for its intended use.

## 1.2. Accounting for Depreciation

Plant assets, with the exception of land, lose their ability, over time, to provide services. Because land has an unlimited life, it is not depreciated. As plant assets are used in the operations of a business, their value to provide service decreases through usage and the passage of time.

This cost allocation of plant asset, called depreciation, is recorded in the accounting books periodically.

Depreciation means the allocation of the cost of a plant asset to the periods that benefit from the services of the asset.

The term depreciation is used to describe the gradual conversion of the cost of the asset into an expense.

Depreciation is not a process of valuation. Accounting records are kept in accordance with the cost principle; they are not indicators of changing price levels. It is possible that, through an advantageous buy and specific market conditions the market value of a building may rise. Nevertheless, depreciation must continue to be recorded because it is the result of an allocation, not a valuation process. The adjusting entry to record depreciation debits Depreciation Expense and credits a contra asset account entitled Accumulated Depreciation or Allowance for Depreciation. The use of a contra asset account allows the original cost to remain unchanged in the plant asset account.

Depreciation can be caused by physical or functional factors.

- *Physical depreciation* factors include wear and tear during use or from exposure to weather.
- *Functional depreciation* factors include obsolescence and changes in customer needs that cause the asset to no longer provide services for which it was intended. For example, equipment may become obsolete due to changing technology.

Two common misunderstandings exist about *depreciation* as used in accounting include:

1. Depreciation does not measure a decline in the market value of a plant asset. Instead, depreciation is an allocation of a plant asset's cost to expense over the

asset's useful life. Thus, the book value of a plant asset (cost less accumulated depreciation) usually does not agree with the asset's market value. This is justified in accounting because a plant asset is for use in a company's operations rather than for resale.

2. Depreciation does not provide cash to replace plant assets as they wear out. This misunderstanding may occur because depreciation, unlike most expenses, does not require an outlay of cash when it is recorded.

? Dear Learners! Would you have more cash if you depreciated your car?

The answer is no. Depreciation does not affect your cash flows. Likewise, depreciation does not affect the cash flows of a business. However, depreciation is subtracted in determining net income.

### **2.2.1. Factors in Computing Depreciation Expense**

Three factors determine the depreciation expense for a plant asset. These three factors are as follows:

- The plant asset's initial cost
- The plant asset's expected useful life
- The plant asset's estimated residual value
- The plant asset's estimated depreciable cost

The initial cost of a plant asset is determined using the purchase price and all amounts spent to get the asset in place and ready for use. The expected useful life of a plant asset is estimated at the time the asset is placed into service. Estimates of expected useful lives are available from industry trade associations. The Internal Revenue Service also publishes guidelines for useful lives, which may be helpful for financial reporting purposes. However, it is not uncommon for different companies to use a different useful life for similar assets.

The residual value of a plant asset at the end of its useful life is estimated at the time the asset is placed into service. Residual value is sometimes referred to as scrap value, salvage value, or trade-in value. The difference between a plant asset's initial cost and

its residual value is called the asset's depreciable cost. The depreciable cost is the amount of the asset's cost that is allocated over its useful life as depreciation expense. If a fixed asset has no residual value, then its entire cost should be allocated to depreciation.

### Periodic depreciation Expense

For an asset placed into or taken out of service during the first half of a month, many companies compute depreciation on the asset for the entire month. That is, the asset is treated as having been purchased or sold on the first day of that month. Likewise, purchases and sales during the second half of a month are treated as having occurred on the first day of the next month. To simplify, this practice is used in this chapter. The four depreciation methods used most often are as follows:

1. Straight-line depreciation
2. Double-declining-balance depreciation
3. Sum-of-the-years-digits method
4. Units-of-production depreciation

#### (1) Straight-Line Method

The ***straight-line method*** provides for the same (uniform/even) amount of depreciation expense for each accounting period (year) of the asset's useful life. It is the most widely used depreciation method. To illustrate, assume that equipment was purchased on January 1 as follows:

Initial cost	\$24,000
Expected useful life	5 years
Estimated residual value	\$2,000

The annual straight-line depreciation of \$4,400 is computed below.

$$\text{Annual Depreciation} = \frac{\text{Cost-Residual Value}}{\text{Useful Life}} = \frac{\$24,000 - \$2,000}{5 \text{ Years}} = \underline{\underline{\$4,400 \text{ per year}}}$$

The computation of straight-line depreciation may be simplified by converting the annual depreciation to a percentage of depreciable cost. The depreciation rate may also be expressed as a fraction. For example, the annual straight-line rate for an asset with a

three-year useful life is  $1/3$ . The straight-line percentage is determined by dividing 100% by the number of years of expected useful life, as shown below.

Expected Years of Useful Life	Straight-Line Percentage
2 years	50% (100%/2)
3 years	33.33% (100%/3)
5 years	20% (100%/5)
8 years	12.5% (100%/8)
10 years	10% (100%/10)
20 years	5% (100%/20)
25 years	4% (100%/25)

For the preceding equipment, the annual depreciation of \$4,400 can be computed by multiplying the depreciable cost of \$22,000 by 20% (100%/5). As shown above, the straight-line method is simple to use. When an asset's revenues are about the same from period to period, straight-line depreciation provides a good matching of depreciation expense with the asset's revenues.

## **(2) Double-Declining-Balance Method**

The double-declining-balance method provides for a declining periodic expense over the expected useful life of the asset. The double-declining-balance method is applied in three steps.

*Step 1: Determine the straight-line percentage using the expected useful life.*

*Step 2: Determine the double-declining-balance rate by multiplying the straight-line rate from Step 1 by two.*

*Step 3: Compute the depreciation expense by multiplying the double-declining-balance rate from Step 2 times the book value of the asset.*



To illustrate, the equipment purchased in the preceding example is used to compute double-declining-balance depreciation. For the first year, the depreciation is \$9,600, as shown below.

Step 1: Straight-line percentage = 20% (100%/5)

Step 2: Double-declining-balance rate = 40% (20% x 2)

Step 3: Depreciation expense = \$9,600 (\$24,000 x 40%)

For the first year, the book value of the equipment is its initial cost of \$24,000. After the first year, the book value (cost minus accumulated depreciation) declines and, thus, the depreciation also declines. The double-declining-balance depreciation for the full five-year life of the equipment is shown below.

Year	Cost	Acc. Dep. At beginning of year	Book value at beginning of year	Rate	Depreciation for year	Book value at end of year
1	\$24,000		\$24,000	40%	\$9,600	\$14,400
2	\$24,000	\$9,600	14,400	40%	5,760	8,640
3	\$24,000	15,360	8,640	40%	3,456	5,184
4	\$24,000	18,816	5,184	40%	2,073.6	3,110
5	\$24,000	20,889.60	3,110.4	40%	1,110.4	2,000

When the double-declining-balance method is used, the estimated residual value is not considered. However, the asset should not be depreciated below its estimated residual value.

In the above example, the estimated residual value was \$2,000. Therefore, the depreciation for the fifth year is \$1,110.40 (\$3,110.40 - \$2,000.00) instead of \$1,244.16 (40% x \$3,110.40).

The double-declining-balance method provides a higher depreciation in the first year of the asset's use, followed by declining depreciation amounts. For this reason, the double-declining-balance method is called an ***accelerated depreciation method***. An asset's revenues are often greater in the early years of its use than in later years. In such cases, the double-declining-balance method provides a good matching of depreciation expense with the asset's revenues.

### (3) Sum-of-the-Years-Digits Depreciation

Under the sum-of-the-years-digits method, depreciation expense is determined by multiplying the original cost of the asset less its estimated residual value by a smaller fraction each year. Thus, the sum-of-the-years-digits method is similar to the double-declining-balance method in that the depreciation expense declines each year. The basic idea behind the sum of the years' digits method is that more service benefits are received in the early years of an asset's life when it is new, and fewer benefits are received each years as the asset grows older. Many assets are efficient when first purchased but become less efficient as time passes. The denominator of the fraction used in determining the depreciation expense is the sum of the digits of the years of the asset's useful life. For example, an asset with a useful life of five years would have a denominator of 15 (5+4+3+2+1). The denominator can also be determined using the following formula where N is the useful life of the asset:

$$\text{Sum of Years of Useful Life} = \frac{N(N + 1)}{2} = \frac{5(5 + 1)}{2} = 15$$

The numerator of the fraction is the number of years of useful life remaining at the beginning of each year for which depreciation is being computed. Thus, the numerator decreases each year by 1. For a useful life of five years, the numerator is 5 the first year, 4 the second year, 3 the third year, and so on. To illustrate, the equipment example from the illustrations for the straight-line and double-declining-balance methods is used as follows: Using the sum-of-the-years-digits method, the depreciation is computed as shown below.

Year	Cost less Residual value	Rate	Depreciation for year	Accumulated Dep. at End of year	Book value at end of year
1	\$22,000	5/15	\$7,333.33	\$7,333.33	\$16,666.67
2	22,000	4/15	5,866.67	13,200.00	10,800.00
3	22,000	3/15	4,400.00	17,600.00	6,400.00
4	22,000	2/15	2,933.33	20,533.33	3,466.67
5	22,000	1/15	1,466.67	22,000.00	2,000.00

At one time, the sum-of-the-years-digits method of depreciation was widely used. However, current tax law changes have limited its use. A recent edition of *Accounting Trends & Techniques* reported that only 1%–2% of the surveyed companies now use this method for financial reporting purposes.

**NB.** The above illustration for the sum of year's digit method is based on the assumption that the first use of the asset coincide with the beginning of the fiscal period. When the first use of the asset does not coincide with the beginning of a fiscal year, it is necessary to allocate each full year's depreciation b/n the two fiscal years benefited. Assuming that the asset in the example was placed in service after four months of the fiscal year had been elapsed, the depreciation for that fiscal year would be \$ 4,888.89 computed as follows:

First year depreciation =  $5/15 \times (24,000 - 2,000) \times 8/12$ ..... \$ 4,888.89  
 Therefore, the depreciation for the second year would be .... \$6,355.55

Computed as follows:

=  $5/15 \times (24,000 - 2,000) \times 4/12$ ..... \$2,444.44  
 =  $4/15 \times (24,000 - 2,000) \times 8/12$ .....3,911.11  
 Total, second fiscal year depreciation..... \$6,355.55

#### **(4) Units-of-Production Method**

This method yields a depreciation charge that varies with the amount of assets usage. To apply this method, the length of life of the assets is expressed in terms of productive capacity, such as hours, miles, number of units etc. Depreciation is first computed for the appropriate unit of production and the depreciation for each accounting period is

then determined by multiplying the unit depreciation by the number of units used.

The units-of-production method is applied in two steps.

*Step 1: Determine the depreciation per unit as:*

$$\text{Depreciation per Unit} = \frac{\text{Cost} - \text{Residual Value}}{\text{Total Units of Production}}$$

*Step 2: Compute the depreciation expense as:*

$\text{Depreciation Expense} = \text{Depreciation per Unit} \times \text{Total Units of Production}$ <p style="text-align: center;">Used</p>
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To illustrate, assume that the equipment in the preceding example is expected to have a useful life of 10,000 operating hours. During the year, the equipment was operated 2,100 hours. The units-of-production depreciation for the year is \$4,620, as shown below.

Step 1: Determine the depreciation per unit as:

$$\text{Depreciation per Hour} = \frac{\text{Cost} - \text{Residual Value}}{\text{Total Units of Production}} = \frac{\$24,000 - \$2,000}{10,000 \text{ Hours}} = \$2.20 \text{ per Hour}$$

Step 2: Compute the depreciation expense as:

$$\text{Depreciation Expense} = \text{Depreciation per Unit} \times \text{Total Units of Production}$$

Used

$$\text{Depreciation Expense} = \$2.20 \text{ per Hour} \times 2,100 \text{ Hours} = \underline{\underline{\$4,620}}$$

Assume that the equipment was operated during the year 2 through 5: 1,500 hours, 2,600 hours, 1,800 hours and 2,000 hours. Hence, using the units-of-production method, the depreciation is computed as shown below.

Year	Hours operated	Rate	Annual Dep. end of Year	Acc. Dep. at end of Year	Book Value at end of Year
1	2,100	\$2.20	\$4,620	\$4,620	\$19,380
2	1,500	2.20	3,300	7,920	16,080

3	2,600	2.20	5,720	13,620	10,380
4	1,800	2.20	3,960	17,600	6,400
5	2,000	2.20	4,400	22,000	2,000

The units-of-production method is often used when a fixed asset's in-service time (or use) varies from year to year. In such cases, the units-of-production method matches depreciation expense with the asset's revenues.

### ***Comparing Depreciation Methods***

The three depreciation methods are summarized in following show. All three methods allocate a portion of the total cost of an asset to an accounting period, while never depreciating an asset below its residual value.

Method	Useful life	Depreciable cost	Depreciation rate	Depreciation Expense
Straight-line	Years	Cost less residual value	Straight-line rate*	Constant
Units of production	Total units of production	Cost less residual value	(cost-residual value)/total units of production	Variable
Double declining balance	years	Declining book value, but not below residual value	Straight-line rate* X 2	Declining
*straight-line rate =(1/useful life)				

The straight-line method provides for the same periodic amounts of depreciation expense over the life of the asset. The units-of-production method provides for periodic amounts of depreciation expense that vary; depending on the amount the asset issued. The double-declining-balance method and sum-of-years-digits method provide for a higher depreciation amount in the first year of the asset's use, followed by declining amounts.

### 2.2.2. Revising Depreciation Estimates

Estimates of residual values and useful lives of plant assets may change due to abnormal wear and tear or obsolescence. When new estimates are determined, they are used to determine the depreciation expense in future periods. The depreciation expense recorded in earlier years is not affected.

To illustrate, assume the following data for a machine that was purchased on January 1, 2011.

Initial machine cost	\$140,000
Expected useful life	5 years
Estimated residual value	\$10,000
Annual depreciation using the straight-line method $[(\$140,000 - \$10,000)/5\text{years}]$	\$26,000

At the end of 2012, the machine's book value (un-depreciated cost) is \$88,000, as shown below.

Initial machine cost	\$140,000
Less accumulated depreciation (\$26,000 per year x 2 years)	<u>52,000</u>
	<u>\$88,000</u>
Book value (un depreciated cost ), end of second year	

During 2013, the company estimates that the machine's remaining useful life is eight years (instead of three) and that its residual value is \$8,000 (instead of \$10,000). The depreciation expense for each of the remaining eight years is \$10,000, computed as follows:

Book value (un depreciated cost ), end of second year	\$88,000
Less revised estimated residual value	<u>8,000</u>
Revised remaining depreciable cost	<u>\$80,000</u>
Revised annual depreciation expense $[(\$88,000 - \$8,000)/8\text{ years}]$	<u>\$10,000</u>

### 2.2.3. Recording Depreciation

The amount by which a fixed asset decreases is an expense of the business. The

amount of depreciation expense should be recorded each fiscal period. If depreciation expense is not recorded, the income statement will not contain all the expenses of the business. This will cause the net income to be reported higher than it should be.

Income tax laws allow a business to deduct depreciation as an expense in determining net income. If depreciation expenses are not included on the income tax reports, the business will pay more income taxes than it should be.

Depreciation may be recorded by an entry at the end of each month, or the adjustment may be delayed until the end of the year.

To record the periodic cost expiration (allocation) of plant asset, the expense account, depreciation expense is debited and the part of the entry that records the decrease in the plant asset is credited to a contra asset account entitled Accumulated Depreciation or Allowance for Depreciation. The use of this contra asset account permits the original cost to remain unchanged in the plant asset account. This facilitates the computation of periodic depreciation, the listing of both cost and accumulated depreciation on the balance sheet, and reporting required for property and income tax purposes.

**NB.** *An exception to the general procedure of recording depreciation monthly or annually is often made when a plant asset is sold, traded-in, or discarded.*

### **1.3. Capital Expenditures and Revenue Expenditures**

Once a fixed asset has been acquired and placed in service, costs may be incurred for ordinary maintenance and repairs. In addition, costs may be incurred for improving an asset or for extraordinary repairs that extend the asset's useful life. Costs that benefit only the current period are called *revenue expenditures*. Costs that improve the asset or extend its useful life are *capital expenditures*. Capital Expenditures- are expenditures that improve the operating efficiency (or capacity) or costs incurred to achieve greater future benefits.

- ***Ordinary Maintenance and Repairs:*** Costs related to the ordinary maintenance and repairs of a fixed asset are recorded as an expense of the current period. Such expenditures are revenue expenditures and are recorded as increases to Repairs and Maintenance Expense. For example, \$400 paid for a tune-up of a delivery truck is recorded as follows:

Repair and maintenance expense	\$ 400
Cash	400

- **Asset Improvements:** After a fixed asset has been placed in service, costs may be incurred to improve the asset.
- For example, the service value of a delivery truck might be improved by adding a \$5,500 hydraulic lift to allow for easier and quicker loading of cargo. Such costs are capital expenditures and are recorded as increases to the fixed asset account. In the case of the hydraulic lift, the expenditure is recorded as follows:

Delivery truck	\$5,500
Cash	5,500

Because the cost of the delivery truck has increased, depreciation for the truck would also change over its remaining useful life.

- **Extraordinary Repairs:** After a fixed asset has been placed in service, costs may be incurred to extend the asset's useful life. For example, the engine of a forklift that is near the end of its useful life may be overhauled at a cost of \$4,500, extending its useful life by eight years. Such costs are *capital expenditures* and are recorded as a decrease in an accumulated depreciation account. In the case of the forklift, the expenditure is recorded as follows:

Accumulated depreciation- Forklift	4,500
Cash	4,500

- Because the forklift's remaining useful life has changed, depreciation for the forklift would also change based on the new book value of the forklift.

The accounting for revenue and capital expenditures is summarized below.

## 1.4. Disposal of Plant Assets

Plant assets that are no longer useful may be **discarded**, **sold** or **exchanged**. In such cases, the plant asset is removed from the accounts. Just because a plant asset is fully depreciated, however, does not mean that it should be removed from the accounts. If a plant asset is still being used, its cost and accumulated depreciation should remain in the ledger even if the asset is fully depreciated. This maintains accountability for the



asset in the ledger. If the asset was removed from the ledger, the accounts would contain no evidence of the continued existence of the asset. In addition, cost and accumulated depreciation data on such assets are often needed for property tax and income tax reports.

*NB: The entry to record the disposal of a plant asset removes the cost of the asset and its accumulated depreciation from the accounts.*

### **(a) Discarding Plant Assets**

If a plant asset is no longer used and has no residual value, it is discarded. For example, assume that a plant asset that is fully depreciated and has no residual value is discarded. The entry to record the discarding removes the asset and its related accumulated depreciation from the ledger.

To illustrate, assume that equipment acquired at a cost of \$25,000 is fully depreciated at December 31, 2009. On February 14, 2010, the equipment is discarded. The entry to record the discard is as follows:

Feb 14	Accumulated Depreciation - Equipment	25,000
	Equipment	25,000

(To write off equipment discarded)

If an asset has not been fully depreciated, depreciation should be recorded before removing the asset from the accounting records.

To illustrate, assume that equipment costing \$6,000 with no estimated residual value is depreciated at a straight-line rate of 10%. On December 31, 2010, the accumulated depreciation balance, after adjusting entries, is \$4,750. On March 24, 2011, the asset is removed from service and discarded. The entry to record the depreciation for the three months of 2011 before the asset is discarded is as follows:

Mar 24	Depreciation expense _ equipment	150
	Accumulated Depreciation _ Equipment	150

To record current depreciation on equipment discarded (600x3/12)

The discarding of the equipment is then recorded as follows:

Mar 24	Accumulated Depreciation _ equipment	4,900
	Loss on disposal of equipment	1,100
	Equipment	6,000

To write off equipment discarded

The loss of \$1,100 is recorded because the balance of the accumulated depreciation account (\$4,900) is less than the balance in the equipment account (\$6,000). Losses on the discarding of **plant assets are non-operating items and are normally reported in the "Other Expense" section of the income statement.**

### **(b) Selling Plant Assets**

The entry to record the sale of a plant asset is similar to the entries for discarding an asset. The only difference is that the receipt of cash is also recorded. If the selling price is more than the book value of the asset, a gain is recorded. If the selling price is less than the book value, a loss is recorded.

To illustrate, assume that equipment is purchased at a cost of \$10,000 with no estimated residual value and is depreciated at a straight-line rate of 10%. The equipment is sold for cash on October 12 of the eighth year of its use. The balance of the accumulated depreciation account as of the preceding December 31 is \$7,000.

The entry to update the depreciation for the nine months of the current year is as follows:

Oct 12	Depreciation expense _ equipment	750	
	Accumulated Depreciation _ Equipment		750
	<i>(To record current depreciation on equipment sold (10,000x9/12x10%))</i>		

After the current depreciation is recorded, the book value of the asset is \$2,250 (\$10,000 - \$7,750). The entries to record the sale, assuming three different selling prices, are as follows:

***Sold at book value, for \$2,250. No gain or loss.***

<i>Oct</i>	<i>1</i>	<i>Cash</i>	<i>2,250</i>	
	<i>2</i>	Accumulated Depreciation _ Equipment	<i>7,750</i>	
		Equipment		<i>10,000</i>

*Sold below book value, for \$1,000. Loss of \$1,250*

<i>Oc</i>	<i>12</i>	<i>Cash</i>	<i>1,000</i>	
<i>t</i>		Accumulated Depreciation _ Equipment	<i>7,750</i>	
		Loss on sale of Equipment	<i>1,250</i>	
		Equipment		<i>10,000</i>

*Sold above book value, for \$2,800. Gain of \$550.*

<i>Oc</i>	<i>12</i>	<i>Cash</i>	<i>2,800</i>	
<i>t</i>		Accumulated Depreciation _ Equipment	<i>7,750</i>	
		Equipment		<i>10,000</i>
		Gain on sale of Equipment		<i>550</i>

### (c) Exchanging Similar Plant Assets

Old equipment is often traded in for new equipment having a similar use. In such cases, the seller allows the buyer an amount for the old equipment traded in. This amount, called the trade-in allowance, may be either greater or less than the book value of the old equipment. The remaining balance - the amount owed is either paid in cash or recorded as a liability. It is normally called **boot**, which is its tax name. Accounting for the exchange of similar assets depends on whether the transaction has commercial substance.

An exchange has commercial substance if future cash flows change as a result of the exchange. If an exchange of similar assets has commercial substance, a gain or loss is recognized based on the difference between the book value of the asset given up (exchanged) and the fair market value of the asset received. In such cases, the exchange is accounted for similar to that of a sale of a fixed asset.

## Gain on Exchange

To illustrate a gain on an exchange of similar assets, assume the following:

### *Similar equipment acquired (new):*

Price (fair market value) of new equipment . . . . .	\$5,000
Trade-in allowance on old equipment . . . . .	<u>1,100</u>
Cash paid at June 19, date of exchange . . . . .	<u>\$3,900</u>

### *Equipment traded in (old):*

Cost of old equipment . . . . .	\$4,000
Accumulated depreciation at date of exchange . . . . .	<u>3,200</u>
Book value at June 19, date of exchange . . . . .	<u>\$800</u>

The entry to record this exchange and payment of cash is as follows:

June 19: Accumulated Depreciation—Equipment . . . . .	3,200
Equipment (new equipment) . . . . .	5,000
Equipment (old equipment) . . . . .	4,000
Cash . . . . .	3,900
Gain on Exchange of Equipment . . . . .	300

The gain on the exchange, \$300, is the difference between the fair market value of the new asset of \$5,000 and the book value of the old asset traded in of \$800 plus the cash paid of \$3,900 as shown below.

Price (fair market value) of new equipment . . . . .		\$5,000
Less assets given up in exchange:		
Book value of old equipment (\$4,000 - \$3,200) . . .	\$ 800	
Cash paid on the exchange . . . . .	<u>3,900</u>	<u>4,700</u>
Gain on exchange of assets . . . . .		<u>\$ 300</u>

## Loss on Exchange

To illustrate a loss on an exchange of similar assets, assume that instead of a trade-in

allowance of \$1,100, a trade-in allowance of only \$675 was allowed in the preceding example. In this case, the cash paid on the exchange is \$4,325 as shown below.

Price (fair market value) of new equipment . . . . .	\$5,000
Trade-in allowance of old equipment . . . . .	<u>675</u>
Cash paid at June 19, date of exchange . . . . .	<u><u>\$4,325</u></u>

The entry to record this exchange and payment of cash is as follows:

June 19: Accumulated Depreciation—Equipment . . . . .	3,200	
Equipment (new equipment) . . . . .	5,000	
Loss on Exchange of Equipment . . . . .	125	
Equipment (old equipment) . . . . .		4,000
Cash . . . . .		4,325

The loss on the exchange, \$125, is the difference between the fair market value of the new asset of \$5,000 and the book value of the old asset traded in of \$800 plus the cash paid of \$4,325 as shown below.

Price (fair market value) of new equipment . . . . .		\$5,000
Less assets given up in exchange:		
Book value of old equipment (\$4,000 - \$3,200) . . .	\$ 800	
Cash paid on the exchange . . . . .	<u>4,325</u>	<u>5,125</u>
Loss on exchange of assets . . . . .		<u><u>\$ (125)</u></u>

In those cases where an asset exchange lacks commercial substance, no gain is recognized on the exchange. Instead, the cost of the new asset is adjusted for any gain. For example, in the first illustration, the gain of \$300 would be subtracted from the purchase price of \$5,000 and the new asset would be recorded at \$4,700. Accounting for the exchange of assets that lack commercial substance will be discussed in next advanced accounting courses. The exchange of similar assets also involves complex tax issues that will be discussed in the future.

### 1.5. Leasing of Plant Assets

A *lease* is a contract for the use of an asset for a period of time. Leases are often

used in business. For example, automobiles, computers, medical equipment, buildings, and airplanes are often leased.

The two parties to a lease contract are as follows:

- ⊖ The **lessor** is the party who owns the asset.
- ⊖ The **lessee** is the party to whom the rights to use the asset are granted by the lessor.

Under a lease contract, the lessee pays rent on a periodic basis for the lease term. The lessee accounts for a lease contract in one of two ways depending on how the lease contract is classified. A lease contract can be classified as either a:

- ⊖ Capital lease or
- ⊖ Operating lease

A **capital lease** is accounted for as if the lessee has purchased the asset. The lessee debits an asset account for the fair market value of the asset and credits a long-term lease liability account. The asset is then written off as an expense (amortized) over the life of the capital lease.

An **operating lease** is accounted for as if the lessee is renting the asset for the lease term. The lessee records operating lease payments by debiting Rent Expense and crediting Cash. The lessee's future lease obligations are not recorded in the accounts. However, such obligations are disclosed in notes to the financial statements.

### 1.6. Internal Controls of Plant Assets

The term property, plant, and equipment include all tangible assets with a service life of more than one year that is used in the operation of the business and are not acquired for the purpose of resale. For most entities, property, plant and equipment represent a material amount in the financial statements. When the audit is ongoing engagement, the auditor is able to focus his or her efforts on the current year's activity since the assets acquired in earlier years were subjected to audit tests at the time of acquisitions.

There are four types of property, plant, and equipment transactions in fixed assets.

- (1) Acquisition of capital assets for cash, or other non-monetary considerations (exchange by other fixed assets);
- (2) Disposition of capital (fixed assets) through sale, exchange, retirement, or abandonment;
- (3) Depreciation of capital assets over their useful economic life; and
- (4) Leasing of capital assets

The property, plant and equipment subsidiary ledger is record of all capital assets owned by the entity. It contains information of the cost of the asset, the date acquired, the method of depreciation, and accumulated depreciation. The subsidiary ledger also includes the calculation of depreciation expense for both financial statements and income tax purposes. The subsidiary ledger should be reconciled to the general ledger control account on a monthly basis.

The control procedures for the plant assets:

- Validity and authorization
- Completeness
- Existence of adequate segregation of duties

### 1.7. Intangible Assets

As the word intangible suggests, asset in this classification have no physical substance, Leading examples are good will, patents, trademarks, copy rights etc.

In brief intangible assets are assets, which are used in the operation of the business but which have no physical substance and are non-current.

Patents, copyrights, trademarks, and goodwill are long-lived assets that are used in the operations of a business and are not held for sale.

The accounting for intangible assets is similar to that for fixed assets. The major issues are:

- Determining the initial cost.
- Determining the ***amortization***, this is the amount of cost to transfer to expense.

***Amortization*** results from the passage of time or a decline in the usefulness of the intangible asset.

**Patents:** Manufacturers may acquire exclusive rights to produce and sell goods with

one or more unique features. Such rights are granted by patents, which the federal government issues to inventors. These rights continue in effect for 20 years. A business may purchase patent rights from others, or it may obtain patents developed by its own research and development.

The initial cost of a purchased patent, including any legal fees, is debited to an asset account. This cost is written off, or amortized, over the years of the patent's expected useful life. The expected useful life of a patent may be less than its legal life. For example, a patent may become worthless due to changing technology or consumer tastes.

Patent amortization is normally computed using the straight-line method. The amortization is recorded by debiting an amortization expense account and crediting the patents account. A separate contra asset account is usually not used for intangible assets.

#### **To illustrate**

Assume that on Jan 2, 2002 MOHA Soft Drink Bottling company purchased a patent on a unique bottle cap for Br. 54,000.

The entry to record the patent would be as follows: 2002

Jan 2. Patent.....	54,000
Cash.....	54,000

*To record the purchase of Bottle cap patent*

Assume that MOHA's management determines that, although the patent for the bottle cap will last for seventeen years, the product using the cap will be sold only for the next six years. The entry to record the annual amortization would be as follows:

Amortization Expense.....	9,000.00
Patent.....	9,000.00

To record annual amortization of patent (Br. 54000/ 6 years)

Note that the patent account is reduced directly by the amount of the amortization expense. This is in contrast to other long-term asset accounts in which depreciation or depletion is accumulated in a separate contra account.



If the patent becomes worthless before it is fully amortized, the remaining carrying value is written off as a loss. For instance, assume that after the first two years MOHA soft Drink Bottling Company's chief competitor's offers a bottle with a new type of cap that makes MOHA's cap obsolete. The entry to record the loss is:

Loss on patent.....	36,000.00
Patent.....	36,000.00

To record the loss resulting from patents becoming worthless.

Some companies develop their own patents through research and development. In such cases, any research and development costs are usually recorded as current operating expenses in the period in which they are incurred. This accounting for research and development costs is justified on the basis that any future benefits from research and development are highly uncertain.

### Copyrights and Trademarks

The exclusive right to publish and sell a literary, artistic or musical composition is granted by a **copyright**. Copyrights are issued by the federal government and extend for 70 years beyond the author's death.

The costs of a copyright include all costs of creating the work plus any other costs of obtaining the copyright. A copyright that is purchased is recorded at the price paid for it. Copyrights are amortized over their estimated useful lives.

A **trademark** is a name, term, or symbol used to identify a business and its products. Most businesses identify their trademarks with ® in their advertisements and on their products. Under federal law, businesses can protect their trademarks by registering them for 10 years and renewing the registration for 10-year periods. Like a copyright, the legal costs of registering a trademark are recorded as an asset.

If a trademark is purchased from another business, its cost is recorded as an asset. In such cases, the cost of the trademark is considered to have an indefinite useful life. Thus, trademarks are not amortized. Instead, trademarks are reviewed periodically

for impaired value. When a trademark is impaired, the trademark should be written down and a loss recognized.

## Goodwill

Goodwill refers to an intangible asset of a business that is created from such favorable factors as location, product quality, reputation, and managerial skill. Goodwill allows a business to earn a greater rate of return than normal. Generally accepted accounting principles (GAAP) allow goodwill to be recorded only if it is objectively determined by a transaction. An example of such a transaction is the purchase of a business at a price in excess of the fair value of its **net assets** (**assets - liabilities**). The excess is recorded as goodwill and reported as an intangible asset.

Unlike patents and copyrights, goodwill is not amortized. However, a loss should be recorded if the future prospects of the purchased firm become impaired. This loss would normally be disclosed in the "**Other Expense**" section of the income statement.

To illustrate, assume that on December 31 Genuine Company has determined that \$250,000 of the goodwill created from the purchase of electronic Systems is impaired. The entry to record the impairment is as follows:

Dec.	31	Loss from impaired goodwill	250,000	
		Goodwill (to record impaired goodwill)		250,000

Summary of the characteristics of intangible assets:

Intangible asset	Description	Amortization period	Periodic expense
Patent	Exclusive right to benefit from an innovation	Estimated useful life not to exceed legal life	Amortization expense
Copyright	Exclusive right to benefit from a literary, artistic, or musical composition	Estimated useful life not to exceed legal life	Amortization expense
Trademark	Exclusive use of a name, term,	None	Impairment loss if fair

	or symbol		value less than carrying value(impaired)
<b>Goodwill</b>	Excess of purchase price of a business over the fair value of its net assets	None	Impairment loss if fair value less than carrying value(impaired)

### Solved Problem

On December 31, it was estimated that goodwill of \$40,000 was impaired. In addition, a patent with an estimated useful economic life of 12 years was acquired for \$84,000 on July 1.

### Required:

- Journalize the adjusting entry on December 31 for the impaired goodwill.
- Journalize the adjusting entry on December 31 for the amortization of the patent rights.

### Solution:

- Dec. 31    loss from impaired goodwill.....40,000  

Goodwill.....40,000
- Dec. 31    Amortization expense-patent.....3,500  

Patents.....3,500

## 1.8. Natural Resources

The fixed assets of some companies include timber, metal ores, minerals, or other natural resources. As these resources are harvested or mined and then sold, a portion of their cost is debited to an expense account. This process of transferring the cost of natural resources to an expense account is called **depletion**.

Depletion is the accounting measure used to allocate the acquisition cost of natural resources. Depletion differs from depreciation because depletion focuses specifically on the physical use and exhaustion of the natural resources, while depreciation focuses more broadly on any reduction of the economic value of a plant or fixed asset. The costs of natural resources are usually classified as long-term assets.

Depletion expense is the measure of that portion of long-term assets that is used up in a particular period.

Depletion is determined as follows:

- Here it is assumed that there is no significant residual value left after all the natural resource is extracted.

Step 1: Determine the depletion rate as:

$$\text{Depletion Rate} = \frac{\text{Cost of Resource}}{\text{Estimated Total Units of Resource}}$$

Step 2: Multiply the depletion rate by the quantity extracted from the resource during the period.

$$\text{Depletion Expense} = \text{Depletion Rate} \times \text{Quantity Extracted}$$

To illustrate, assume that KLM Company purchased mining rights as follows:

Cost of mineral deposit ..... \$400,000  
 Estimated total units of resource ..... 1,000,000 tons  
 Tons mined during 1<sup>st</sup> year ..... 90,000 tons

The depletion expense of \$36,000 for the year is computed, as shown below.

Step 1: 
$$\text{Depletion Rate} = \frac{\text{Cost of Resource}}{\text{Estimated Total Units of Resource}} = \frac{\$400,000}{1,000,000 \text{ Tons}} = \$0.40 \text{ per Ton}$$

Step 2: Depletion Expense = \$0.40 per Ton x 90,000 Tons = **\$36,000**

The adjusting entry to record the depletion is shown below.

Dec	31	Depletion Expense	36,000	
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		Accumulated Depletion (to record depletion of mineral deposit)		36,000
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Like the accumulated depreciation account, Accumulated Depletion is a *contra asset account*. It is reported on the balance sheet as a deduction from the cost of the mineral deposit.

### **1.9. Presentation of Plant Assets and Intangible Assets on the Financial Statement**

In the income statement, depreciation and amortization expense should be reported separately or disclosed in a note. A description of the methods used in computing depreciation should also be reported.

In the balance sheet, each class of fixed assets should be disclosed on the face of the statement or in the notes. The related accumulated depreciation should also be disclosed, either by class or in total. The fixed assets may be shown at their book value (cost less accumulated depreciation), which can also be described as their net amount. If there are many classes of fixed assets, a single amount may be presented in the balance sheet, supported by a note with a separate listing. Fixed assets may be reported under the more descriptive caption of property, plant, and equipment.

Intangible assets are usually reported in the balance sheet in a separate section following fixed assets. The balance of each class of intangible assets should be disclosed net of any amortization. The balance sheet presentation for Genuine Company's fixed and intangible assets is shown below.

<b>Genuine Company</b>
------------------------

<p style="text-align: center;"><b>Balance sheet</b> <b>December 31,2013</b></p>			
Property, plant and equipment:			
Land.....		\$ 1.850,00	
Buildings.....	\$ 2,650,000	0	
Less accumulated depreciation .....	<u>420,000</u>		
Office equipment .....	\$ 350,000	2,230,000	
Less accumulated depreciation .....	<u>102,000</u>		
Total property, plant and equipment .....		<u>248,000</u>	\$ 4,328,000
Intangible assets:			
Patents .....			140,000

The cost and related accumulated depletion of mineral rights are normally shown as part of the Fixed Assets section of the balance sheet. The mineral rights may be shown net of depletion on the face of the balance sheet. In such cases, a supporting note discloses the accumulated depletion.